AMENDMENTS TO THE CLAIMS

1. (currently amended) A position control apparatus for controlling position along a depth or z axis, comprising:

an extensible member that can be extended and contracted along said depth or z axis, comprising shape memory alloy configured and positioned to expand and contract linearly along said depth or z axis;

a housing for said extensible member and for at least one optical element located forward of said extensible member, said housing constraining said optical element to move linearly along the depth or z axis;

a heater for controlling the temperature of said shape memory alloy; and

a feedback mechanism for controlling said heater and responsive to variations in said position;

wherein said position is controllable by said heater and said position can be stabilized by said feedback mechanism; and

wherein said extensible member has a forward end coupled to said optical element and a rearward end coupled to said housing at a point rearward of said optical element so that extension and contraction of said extensible member causes said optical element to advance or retreat linearly within said housing along said depth or z axis.

2. (canceled)

3. (previously presented) An apparatus as claimed in claim 1, further comprising biaser for opposing either the expansion or contraction of said shape memory alloy.

4. (previously presented) An apparatus as claimed in claim 3, wherein said biaser is opposed to the contraction of said shape memory alloy.

5. (previously presented) An apparatus as claimed in claim 3, wherein said biaser is a spring.

6. (previously presented) An apparatus as claimed in claim 1, wherein said feedback mechanism comprises a feedback sensor for sensing the position of the apparatus and providing an output directed to said heater to modify the heat applied to the shape memory alloy.

7. (original) An apparatus as claimed in claim 1, wherein said feedback mechanism comprises a plurality of feedback sensors.

8. (previously presented) An apparatus as claimed in claim 1, wherein said heater comprises a source of electrical current for heating said shape memory alloy.

9. (original) An apparatus as claimed in claim 8, wherein said source of electrical current is arranged to heat said shape memory alloy by passing said electrical current through said shape memory alloy.

10. (original) An apparatus as claimed in claim 8, wherein said electrical current is a pulse width modulated current.

11. (previously presented) An apparatus as claimed in claim 10, wherein said heater is controllable to vary the duty cycle of the pulse width modulated current and therefore the average value of said electrical current.

12. (original) An apparatus as claimed in claim 1, wherein said feedback mechanism comprises a capacitance sensor, a variable resistance sensor, a magnetic hall sensor, an inductive sensor, or an optical sensor.

13. (original) An apparatus as claimed in claim 1, wherein said feedback mechanism comprises a capacitive sensor comprising a double wire coil capacitive sensor, wherein the separation of the coils of said double wire coil capacitive sensor varies according to the position of said apparatus thereby varying the output of said sensor.

14. (original) An apparatus as claimed in claim 1, wherein said feedback mechanism comprises an optical sensor comprising a pulsed red Light Emitting Diode and a Phase Locked Amplifying detecting diode.

15. (original) An apparatus as claimed in claim 1, further comprising an elongate member for securing said shape memory alloy to said apparatus, wherein said elongate member is longitudinally substantially rigid and laterally flexible.

16. (original) An apparatus as claimed in claim 15, wherein said elongate member comprises a Bowden Cable.

17. (original) An apparatus as claimed in claim 1, wherein said extensible member is one of a plurality of like extensible members.

18. (previously presented) An apparatus as claimed in claim 1, further comprising a flexible printed circuit board arranged between and attached to two portions of said apparatus whose separation varies as the position is varied, to flex as said separation varies.

19. (previously presented) An apparatus as claimed in claim 1, further comprising a home adjustment mechanism for setting a desired home position in the direction of the axis, such that subsequent adjustment of the position is

relative to said home position.

20. (previously presented) An endoscope comprising:

an optical fiber for providing illuminating light;

a light condenser for focussing said illuminating light to an observational field; and

a position control apparatus according to claim 1, for controlling the position of the observational field.

21. (previously presented) An endoscope as claimed in claim 20, wherein said position is adjustable by movement of an exit aperture of said optical fiber, by movement of said light condenser, or by movement of both said exit aperture and said light condenser, wherein said movement is controllable by said position control apparatus.

22. (previously presented) An endoscope as claimed in claim 20, wherein said endoscope includes an x-y scan mechanism incorporating an exit aperture of said optical fiber, wherein said x-y scan mechanism is adjustable in position by said position control apparatus.

23. (original) An endoscope as claimed in claim 20, wherein said extensible member is one of a plurality of like extensible members.

24. (original) An endoscope as claimed in claim 20, wherein said endoscope is a confocal endoscope.

25. (original) An endoscope as claimed in claim 20, wherein said endoscope is an endomicroscope.

26. (original) A microscope comprising:

a position control apparatus according to claim 1, for controlling the position of an observational field of said microscope.

27. (original) A colonoscope comprising:

a position control apparatus according to claim 1.

28. (currently amended) A method of providing positioning control of a position along a depth or z axis, comprising:

providing an extensible member that can be extended and contracted along said depth or z axis, comprising shape memory alloy configured and positioned to expand and contract linearly along said depth or z axis;

providing a housing for said extensible member and for at least one optical element located forward of said extensible member, said housing constraining said optical element to move linearly along the depth or z axis;

controlling the length of said shape memory alloy by adjusting the temperature of said shape memory alloy; ~~and~~

providing a feedback signal in response to variations in said position and adjusting said temperature according to said feedback signal to stabilize said position; and

coupling a forward end of said extensible member to said optical element and a rearward end of said extensible member to said housing at a point rearward of said optical element so that extension and contraction of said extensible member causes said optical element to advance or retreat linearly within said housing along said depth or z axis;

whereby said position is controllable by adjusting said temperature and said position can be stabilized by said feedback signal.

29. (canceled)

30. (previously presented) A method as claimed in claim 28, further comprising opposing either the expansion or contraction of said shape memory alloy by a biaser.

31. (previously presented) A method as claimed in claim 30, wherein said biaser is a spring.

32. (previously presented) A method as claimed in claim 30, wherein said biaser is opposed to the contraction of said shape memory alloy.

33. (currently amended) A method of performing endoscopy or colonoscopy of a site, comprising:

locating an optical head at said site; and

controlling the position along a depth or z axis of an observational field of said endoscopy or colonoscopy at least in part by a ~~shape memory alloy; and stabilizing said position along said axis by a feedback mechanism~~ position control apparatus as claimed in claim 1.

34. (new) An endoscope as claimed in claim 20, wherein said endoscope includes an x-y scan mechanism within said housing incorporating an exit aperture of said optical fiber and coupled to said forward end of said extensible member, wherein said x-y scan mechanism is adjustable in position by said position control apparatus.